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Richmond Lake Water Quality: Surface Water Pollution from Livestock Production

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RICHMOND LAKE WATER QUALITY PROJECT

Surface Water Pollution from Livestock Production

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The improper management of livestock wastes (manure) can cause surface and groundwater pollution. Water pollution from animal production systems can be by direct discharge, runoff, and/or seepage of pollutants to surface or ground water.

Pollutants are sediment, nutrients, pesticides, organic matter, salts, and micro-organisms.

Polluted surface water can kill fish, cause odors, spread infectious bacteria, and inhibit water-related activities.

The main livestock pollutants in surface water:

• Organic matter and excess nutrients

• Pathogen contamination

Organic matter and excess nutrients

Livestock manure used properly can improve soil fertility and tilth, increase the soil's water holding capacity, and reduce wind and water erosion. However, surface and groundwater pollution can occur if manure applications are mismanaged.

Livestock waste contains nutrient and organic material. Aquatic life relies on the breakdown of organic material for primary and secondary sources of food.

There is a limit, however, to the amount of organic material acceptable in the aquatic environment. Too much organic material produces highly colored, murky water with heavy bottom sludge accumulation. Excess nutrients (especially phosphorous and nitrogen) carried by organic matter may produce overabundant algae and weed growth in surface water. Toxic blue-green algae blooms may even appear when the conditions are right.

The oxidation of the organic material may cause such a reduction in dissolved oxygen that fish and other aquatic life are unable to survive.

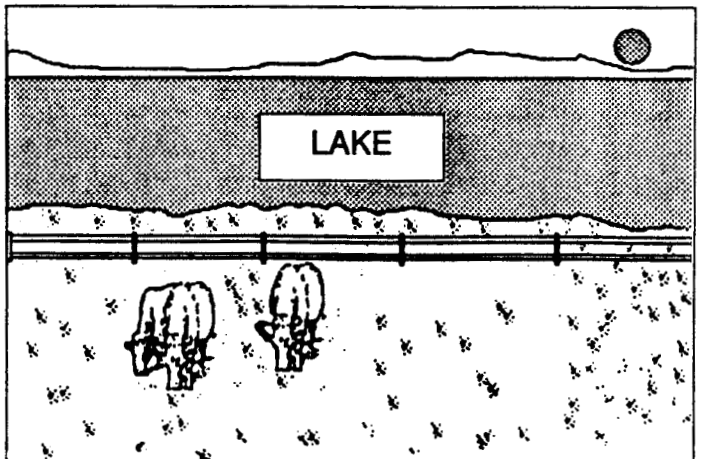
Possible sources of animal waste in surface water include feedlot runoff, manured land runoff, direct animal deposit, and septic systems.

Pathogen contamination

A pathogen is a disease causing microorganism. Possible pathogen contamination in water is determined by using biological indicators. The fecal coliform test is the most commonly used biological indicator.

Fecal coliform are intestinal bacteria found only in mammals and fowl. Fecal coliform are not found in soils, vegetation, insects or fish unless contaminated by mammal or fowl feces. They are not necessarily harmful but indicate the potential presence of other more serious disease-causing organisms.

Fecal bacteria enter surface water by direct deposit of feces and by movement with sediment in overland runoff. The organisms may be dispersed, lack proper environment, and die, or they may find conditions sufficient for long-term survival in bottom



Proper livestock waste management benefits all lake users by sustaining and improving water quality.

sludge or lake bank soils. Their survival depends on water, soil, and air temperature; lake size and flow rate; sediment volume; availability of nutrients and organic material; amount of light; soil type; pH, and other factors.

Seasonal variations in bacteria numbers can be extreme, depending on runoff volumes, temperature, animal activity, ground cover, and sunlight.

The original source of fecal bacteria in surface water is from livestock, wild animals, fowl, and rural septic tank overflows. Consequently, if fecal coliform is to be reduced, livestock contact with surface water and runoff from manured areas into surface water must be controlled and inadequate shoreline septic systems must be corrected.

Controlling surface water pollution from livestock

• **Fence animals out of surface water areas**. Lake water can be used for animal watering piping into approved water holding facilities.

• **Maintain grass buffer areas near surface water**. Buffer pasture and cropland from surface water and swamp areas.

• **Consider using retention ponds or lagoons** for runoff/waste collection.

• **Distribute pond or lagoon effluent back on the land. Do not** allow lagoon and retention pond outflow to enter the surface water.

• **Maintain proper areas for runoff disposal**. Dispose of runoff on grassed areas with good infiltration and percolation rates. These areas can be cropped but should not be allowed to stand without a cover crop during wet months.

• **Manage manure and/or lagoon effluent applied to cropland. Do not** apply effluent to frozen, sloping land susceptible to runoff.

• **Prevent overgrazing of pasture land**.

• **Maintain runoff control facilities**.

For additional information:

- Contact the Richmond Lake Water Quality Project, Soil Conservation Service, or your local Cooperative Extension Service office. Management and technical assistance is available, plus possible financial help.
- "Livestock Waste Facilities Handbook," MWPS-18, available through Midwest Plan Service Office, Agricultural Engineering Dept., SDSU (cost $6.30).
- "The Lake and Reservoir Restoration Guidance Manual," EPA, North American Lake Management Society, 1988.

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